GEM Fellowship Program
The National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc.

Program Description

The National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM) Fellowship Program "is an ever-increasing business case educating and impacting the need for engineers and scientists at the graduate level. Companies, universities, and nonprofit organizations have long had a desire to solve the problem of underrepresentation, and it has been that desire that has built and sustained the GEM Consortium over the last 25 years, allowing GEM to award one of the most prestigious fellowships in the country (GEM's Strategic Plan: 2001–2003, p. 4)." Thus, the Laboratory benefits immensely and immeasurably through the success of the GEM Consortium for its current and future scientific work force. The Laboratory has sponsored up to 42 GEM Fellowships since becoming a corporate member in 1979. Membership with the GEM Consortium further affords the Laboratory access to all GEM Fellows to pursue for possible post-doctoral appointments or full-time research positions.

The GEM Website address is as follows:
http://www.nd.edu/~gem/

Focus of the Program
The intent of this corporate membership with the GEM Consortium is to establish a sustained and continued pipeline of graduate students in science and engineering into the Laboratory's research population and pursuits.

Grade-Level Targeted
The GEM Consortium is targeted to underrepresented graduate students throughout the nation who are pursuing master's and doctorate degrees in engineering and science.

Two former LANL GEM Fellows, Mr. Flores and Ms. Jones expressed their thoughts regarding how beneficial their summers at LANL were as they fulfilled the two consecutive summer internship requirements. And, two current GEM Fellows, Mr. Romero and Mr. Snyder, also expressed how important their fellowship is to their graduate and future and career goals.

Ms. Shaheerah Fateen worked in the Fuel Cell Laboratory of the Engineering Sciences and Applications Division, Applied Engineering Technologies Group (ESA-AET) in the summer of 2001. She is currently pursuing a master's degree in environmental engineering at the Massachusetts Institute of Technology (MIT). Shaheerah's presented research entitled, *Fuel Cell Systems for Personal and Portable Power Applications* involved examining the feasibility and trade-offs of using hydrogen polyelectrolyte membrane (PEM) fuel cells and direct methanol fuel cells (DMFC) to power portable electronic devices. However, currently Shaheerah's research at MIT has taken her to Brazil to conduct research on the design of a wastewater treatment system there.

As a GEM Fellow, Mr. E. Michael Flores published a paper entitled, *Numerical Modeling of Steady-State Heat Pipes with Axially Varying Heat Sources.* This paper was based on numerical work completed at the Energy Process Engineering Group of the Engineering Sciences and Applications (ESA) Division. He completed his master's at The University of Washington.

Michael was mentored by former Lawrence Livermore National Laboratory (LLNL) GEM Fellow, Donald L. Quintana, Ph.D., who further encouraged Michael to apply to the GEM Fellowship Program. Michael was hired into the Laboratory in May 2001 as a technical staff member (TSM) within the same group.

Ms. Triana N. Jones completed her master's at The University of Maryland-College Park. Triana stated, "The GEM Fellowship helped me to successfully achieve both my academic and career goals. My academic goals included attaining additional knowledge in the field of chemical engineering with an emphasis on bioremediation. I used that knowledge and research experience to present a paper at the 1999 Annual Convention of the American Institute of Chemical Engineers in Texas. Upon completion of my thesis, *Characterization of Anaerobic Polycyclic Aromatic Hydrocarbons Degrading Microbial Communities from the Baltimore Harbor*, preliminary findings will further aid in the successful cleaning of these contaminants form the sediment of the Northwest Branch of the Baltimore Harbor." Triana's mentor was David Cremers of the Chemical Science and Technology (CST) Division in which her summer research was completed and entitled, *Investigation of Calibration Methods for Soil Analysis Using Laser-Induced Breakdown Spectroscopy.*

One of our current Fellows, Mr. Russell S. Romero (Fig. 24), is in his first semester at the University of California-Berkeley, where he is studying mechanical engineering. While at the Laboratory, Russell performed research in two different groups to include the Materials Science & Technology (MST-8) and Environmental Sciences and Applications-Weapons Engineering (ESA-WE). Russell's research with MST-8 involved synthesizing bulk single crystals of erbium oxide, a material that was being studied as part of the stockpile stewardship program because of its resistance and inertness to extreme temperatures. Crystals were synthesized using a xenon optical float zone, which is capable of generating the temperatures needed to melt the erbium oxide for single crystal synthesis. Russell has published a number of articles from his research at the Laboratory, one being, *Mechanical Behavior of Erbium Oxide Single Crystals.* Russell's research at ESA-WE consisted of three different projects that allowed experience in engineering design, conceptual design, and experimental design. These projects are on going. Russell is expected to return to continue his work on them as they progress.

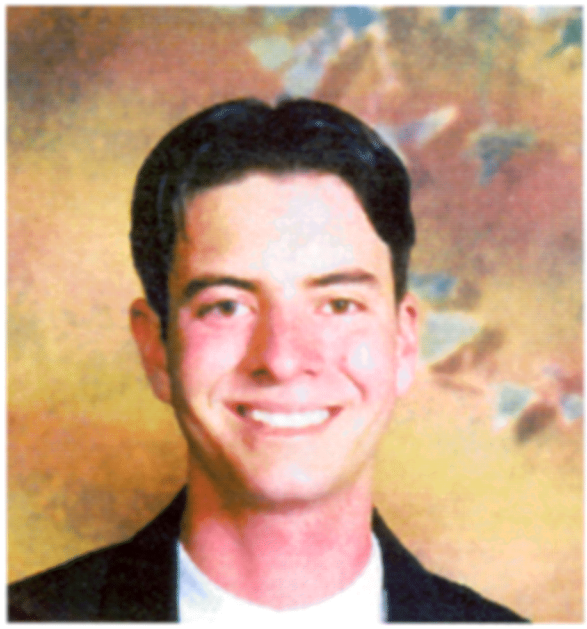

Figure 24. Russell Romero, ESA-WE.

Current GEM Fellow, Mr. Jimmie Snyder, Jr. is attending the Georgia Institute of Technology studying Civil Engineering. Jimmie's GEM Fellowship allowed him the opportunity to attend the graduate school of his choice while summers at the Laboratory afforded him the unique opportunity to interact and forge friendships with students from across the nation.

During Jimmie's three summers at the Laboratory, his research revolved around the construction of the Strategic Computing Complex (SCC). However, as Jimmie's research experience revolved around the SCC project, he had the opportunity to work in three different research areas of the Laboratory. In the summer of 1998, Jimmie worked with Doug Volkman assisting the

Facilities Engineering Group with the design and renovation of their existing parking structure, where he collected statistical data on traffic patterns and the design of a new parking area to accommodate employees displaced by SCC construction.

Jimmie's following two summers included working with mentor Mark Harris in the Project Management Division (PM). There, Jimmie assisted the PM Division with the development of satellite parking areas to assist employees displaced during construction of, again, the SCC. To accomplish this task, Jimmie was responsible for the procurement of excavation and burn permits, inspection of stormwater pollution controls, and contractor oversight on civil/structural activities. His final summer included assisting the PM Division in the design review, construction inspection and management associated with the Strategic Computing Complex project.

Program Description/Design

As a corporate member of the GEM Consortium, the Laboratory program is to provide funding for GEM Fellows to pursue master's and doctorate degrees in engineering and science. To successfully work with the GEM Consortium, the Laboratory not only provides graduate funding assistance, but summer research opportunities to its GEM Fellows. Consequently, to fulfill the requirements of the GEM Fellow agreement through GEM Headquarters, funded Fellows spend two consecutive summers at the Laboratory conducting research.

Recruiting Strategy

The recruitment strategy for the corporate membership/partnership with GEM Headquarters is primarily through educating students in the Laboratory's summer internship program of the merits and benefits a GEM Fellowship would provide to enhance their continued graduate education and their future career goals. However, additional recruitment while on campus visits and during career fairs is another avenue to encourage students to consider summer and/or academic year research opportunities. It is hoped that a GEM fellowship is a positive draw to consider the Laboratory as a viable future career option. Membership with GEM is an obvious indication of the Laboratory's commitment to human and research diversity.

Also, the Laboratory's GEM alumnae/alumni are instrumental in marketing our relationship/partnership for future Fellows. Currently, two alumni serve on the Laboratory's GEM Selection Committee, established in 2000 to ensure suitable and talented selection of the Laboratory's GEM Fellowship recipients. They are mentioned above, Donald Quintana, Ph.D., and Michael Flores. "GEM alumni and alumnae are a natural extension of the marketing effort in that they are the most credible advocates, having been GEM Fellows" (GEM's Strategic Plan: 2001–2003, p. 8).

Performance Objective and Milestones

LANL is providing a stimulating research environment for aspiring young researchers through the GEM Consortium as their goal to "support and develop minority graduate students" is met.

This fiscal year resulted in the development of a Laboratory Selection Committee consisting of leadership from the LANL Employee Scholarship Board, two former LANL and LLNL GEM Fellows, a postdoc, and two staff members from the Education Program Office. One Committee goal is to build on the long-standing relationship to further increase the Laboratory's GEM Fellow numbers. That success will ultimately develop a continuous pipeline of qualified graduate students into the future ranks of advanced scientific research and management.

That Committee selected two new GEM Fellows:

Degree	University	Major
Ph.D.	Stanford	Materials Sci./Eng
M.S.	MIT	Environmental Eng

The above-mentioned goal would encourage current GEM Fellows and future applicants to pursue careers in technical areas with the goal of attracting selected students to the Laboratory as regular members of the technical staff or future partners in research, should their career paths find them teaching at the university level.

The National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (GEM) membership with the Laboratory is not DOE-funded.